

Abstract

Like any other infrastructure activity, pavement design requires the use of natural construction materials that meet the specifications for the intended construction works to meet the quality expected. The study involved prospecting and testing of rocks in Kitui County(Kenya),Kitui Rural Sub-County spanning KwaVonza/Yatta Ward from NyumbaniVillage to Kwa-Kilui in Kyusyani. This study mainly focused on quarrying rocks in selected sites in Kwa-Vonza/Yatta along Yatta Plateau in Kitui County for a proposed road(Ken Road) from Nyumbani Village to Kenyatta University in Kwa-Vonza. Samples were collected from selected locations and subjected to laboratory testing to determine their physical,chemical and mechanical properties for their suitability in pavement construction. The properties tested included plasticity index,natural moisture content,bulk density,California Bearing Ratio,Aggregate Impact Value,dry unit weight,Loss Angeles Abrasion Test,Specific Gravity,Sodium Sulphate Solution Test and Water Absorption Test. The findings show that the identified quarries for stones generally have sufficient quantities for the proposed road works. With regard to the rock properties,the quarry stones sites meet the requirements of water absorption which should be less than 2% and that all quarry sites meet the requirements for sodium sulphate solution threshold of less than 12%.The dry unit weights and the specific gravity for the stone quarry sites are convergent and averaging at 2.0 with Aggregate Impact Value (AIV) results ranging from very strong for Kilawani First Site and Mamole to strong at Kilawani Kwa Joseph. For Katangi,Kwa-Vonza Hill and Independent crusher sites Results of AIV show satisfactory results bordering weak. The results exhibit closeness of results with regard to specific gravity and dry unit weight. Classification tests show the gravel materials at Syokithumbi show Plasticity Index(PI) of medium plasticity levels ranging from 17% to 19%,California Bearing Ratio(CBR) varying from 20% to 62%,maximum dry densities of 1996kg/m³ to 2067kg/m³ , particle sizes of 0.075mm to 10mm and Optimum Moisture Content(OMC) of 7.9% to 12.2%. Based on the above , the study recommends the sites are generally suitable for road pavement construction materials.